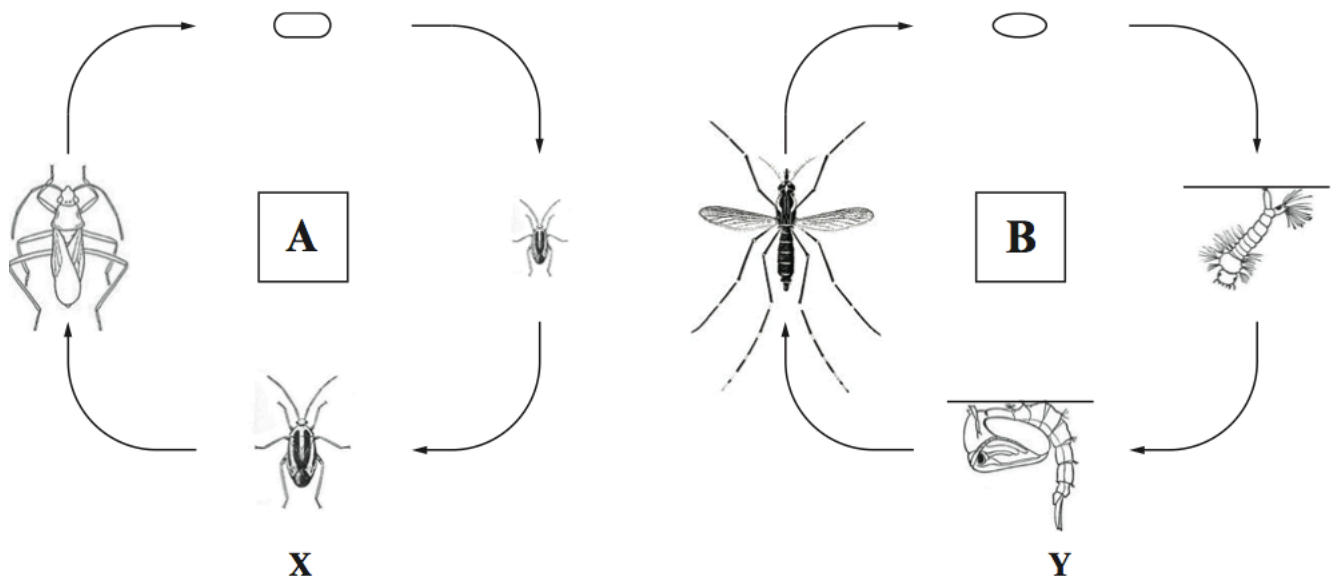


1.

Insects are amongst the animals best adapted to life on land. Their exoskeleton provides a protective waterproof covering, however it creates a problem for growth. The diagrams below show how insects' reproductive strategies help to overcome this problem.



(a) (i) Name the types of life cycle shown above. [1]

A B

(ii) Name the stages X and Y shown in the life cycles above. [1]

X Y

(b) State why having an exoskeleton is a problem for growth and explain how the problem of growing with an exoskeleton is overcome in life cycle A. [3]

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(c) Reptiles and birds are adapted to reproduce on land by producing amniote eggs. Describe **two** features of an amniote egg. [2]

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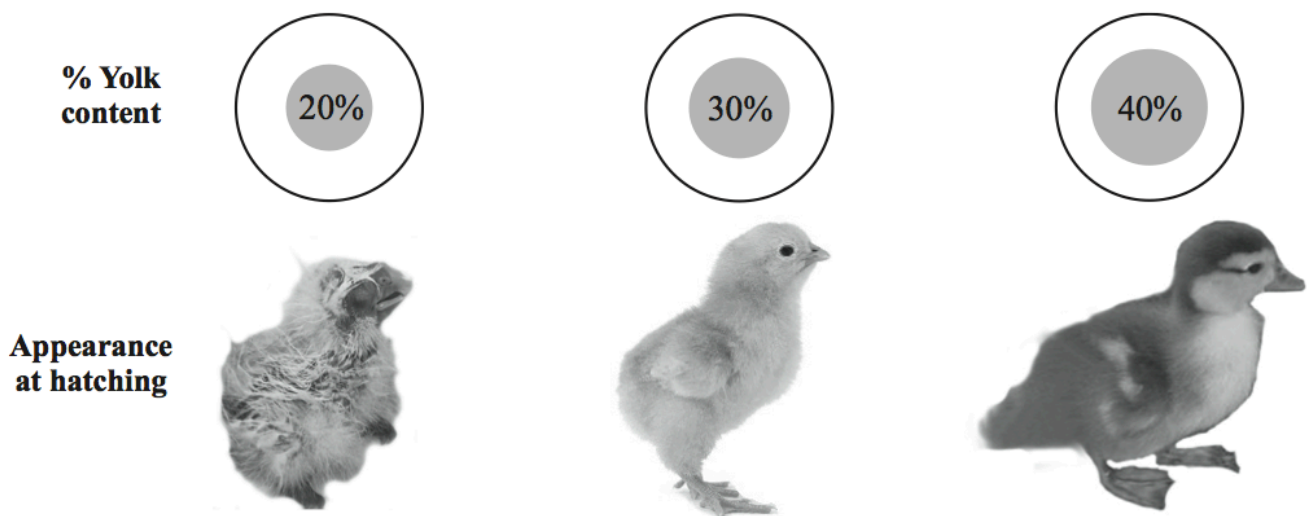
(d) The development of embryos takes place internally in mammals. List **three** ways in which this is an advantage over externally laid eggs. [3]

2.

5. (a) The different classes of vertebrates show a gradual change from an aquatic to a terrestrial existence. Tick (✓) the boxes in the table below, to show the class or classes of vertebrates to which each statement refers. [4]

| <i>Statement</i> | <i>Fish</i> | <i>Amphibia</i> | <i>Reptiles</i> | <i>Birds</i> | <i>Mammals</i> |
|--|-------------|-----------------|-----------------|--------------|----------------|
| Fertilisation is always internal | | | | | |
| Eggs are laid in an aquatic environment | | | | | |
| The embryo is surrounded by a membrane called the amnion | | | | | |
| Both fertilisation and embryo development are always internal | | | | | |

- (b) The diagram shows the percentage of yolk found in the eggs of three different species of birds and the appearance of the chicks at hatching.



- (i) Explain why the chick hatched from the egg with 20% yolk would need the greatest level of parental care after hatching. [2]

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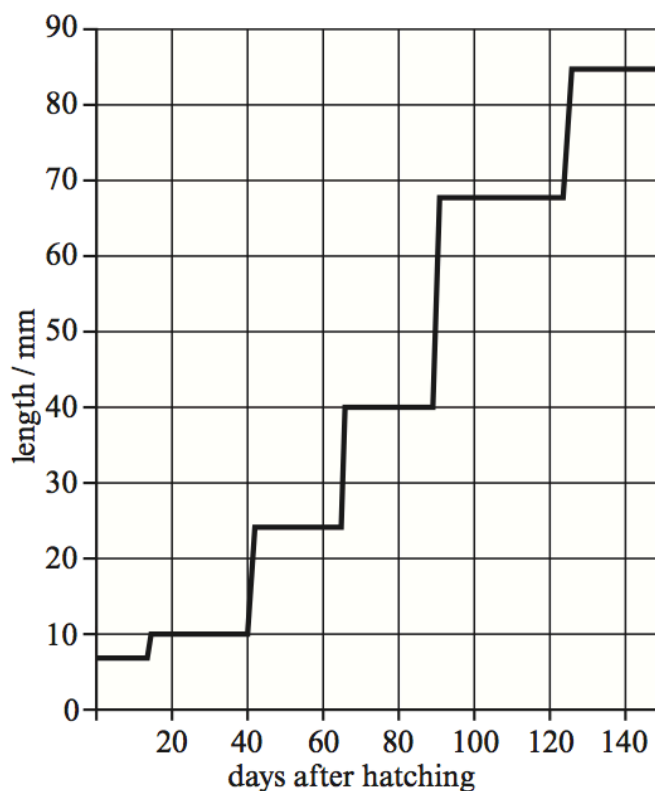
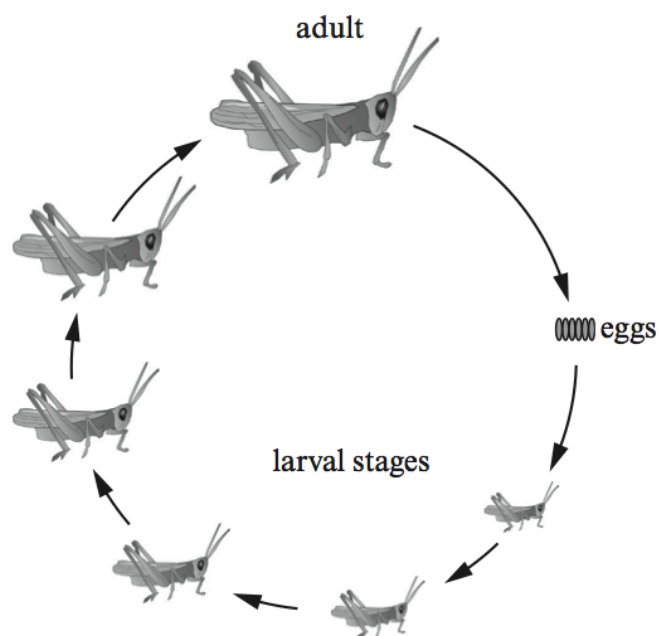
- (ii) Suggest a reason why organisms that provide a high level of parental care to their young often produce fewer offspring. [2]

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(c) Insects are a group of organisms adapted to a terrestrial way of life.

The diagrams below show the stages in the life cycle of a locust and the length of the insect at different times following hatching.



(i) Name the type of insect life cycle shown by the locust. [1]

.....

(ii) What name is given to the different larval stages shown in the diagram? [1]

.....

- (iii) Use your knowledge and understanding of this type of insect life cycle to explain the changes in length of the insect following hatching. [3]

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- (d) As an adaptation to life on land, insects have evolved a different system of gaseous exchange to vertebrates.

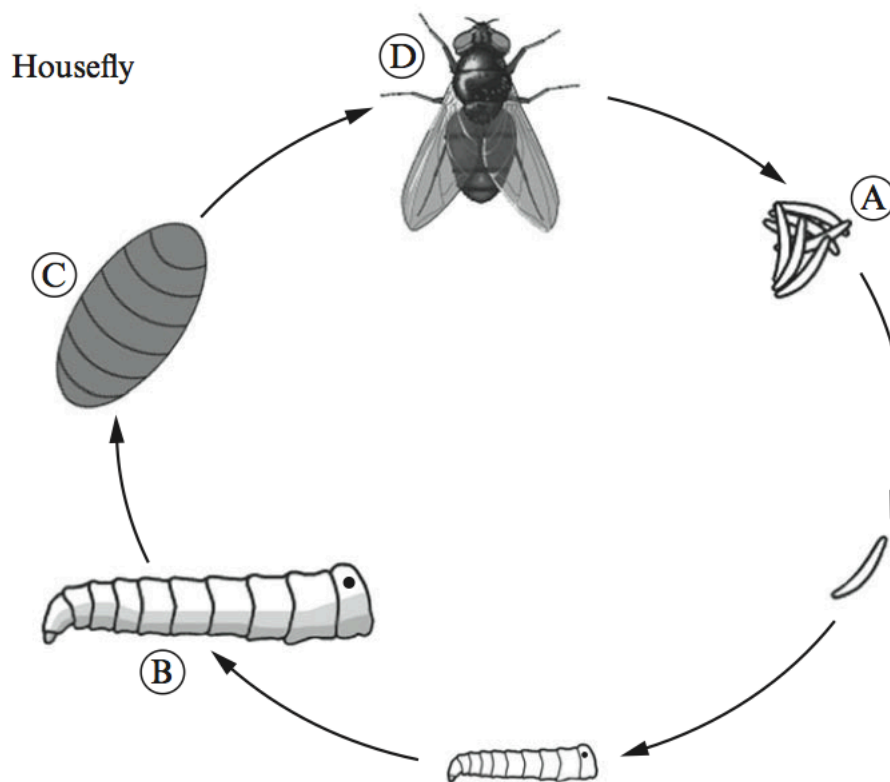
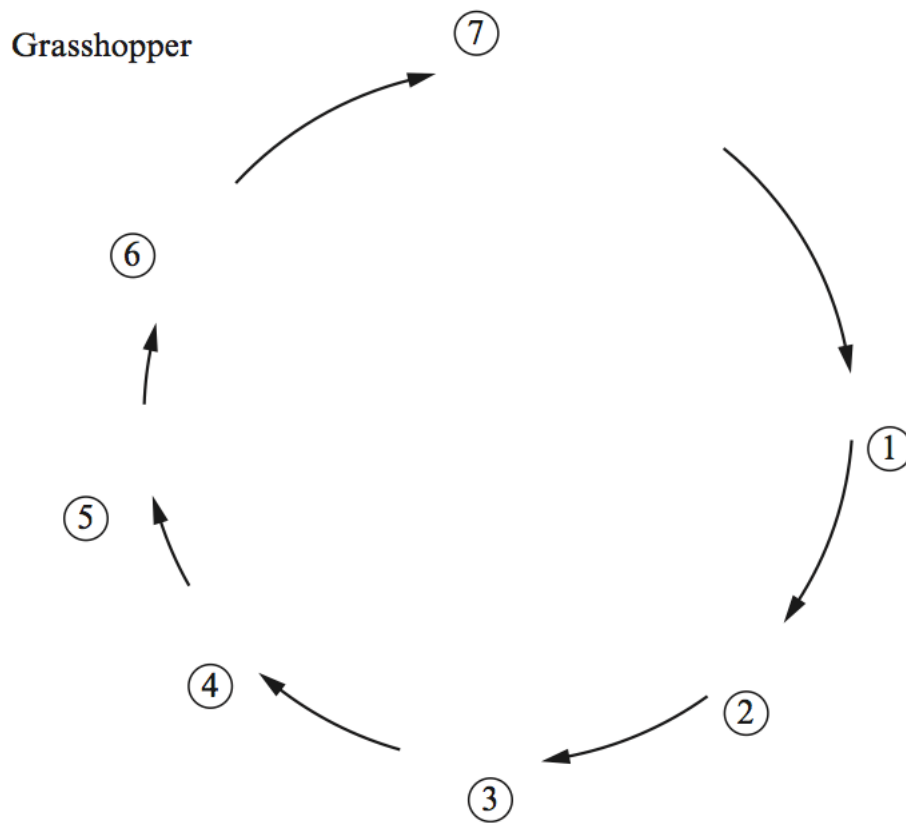
Complete the following sentences, about gaseous exchange, by inserting the most appropriate words to fill in the blanks. [2]

Insects have a system of tubes, called, instead of lungs. These transport oxygen directly to the cells. Air enters these tubes through pores called

(Total 15 marks)

3.

The two diagrams below show life cycles of two different groups of insects (not drawn to scale).



- (a) (i) What name is given to the type of life cycle of the grasshopper? [1]
-
- (ii) Name the stages labelled
- 1,
- 7,
- 2-6. [2]
- (b) (i) What name is given to the type of life cycle of the housefly? [1]
-
- (ii) Name the stages labelled
- A,
- B,
- C,
- D. [2]
- (Total 6 marks)**

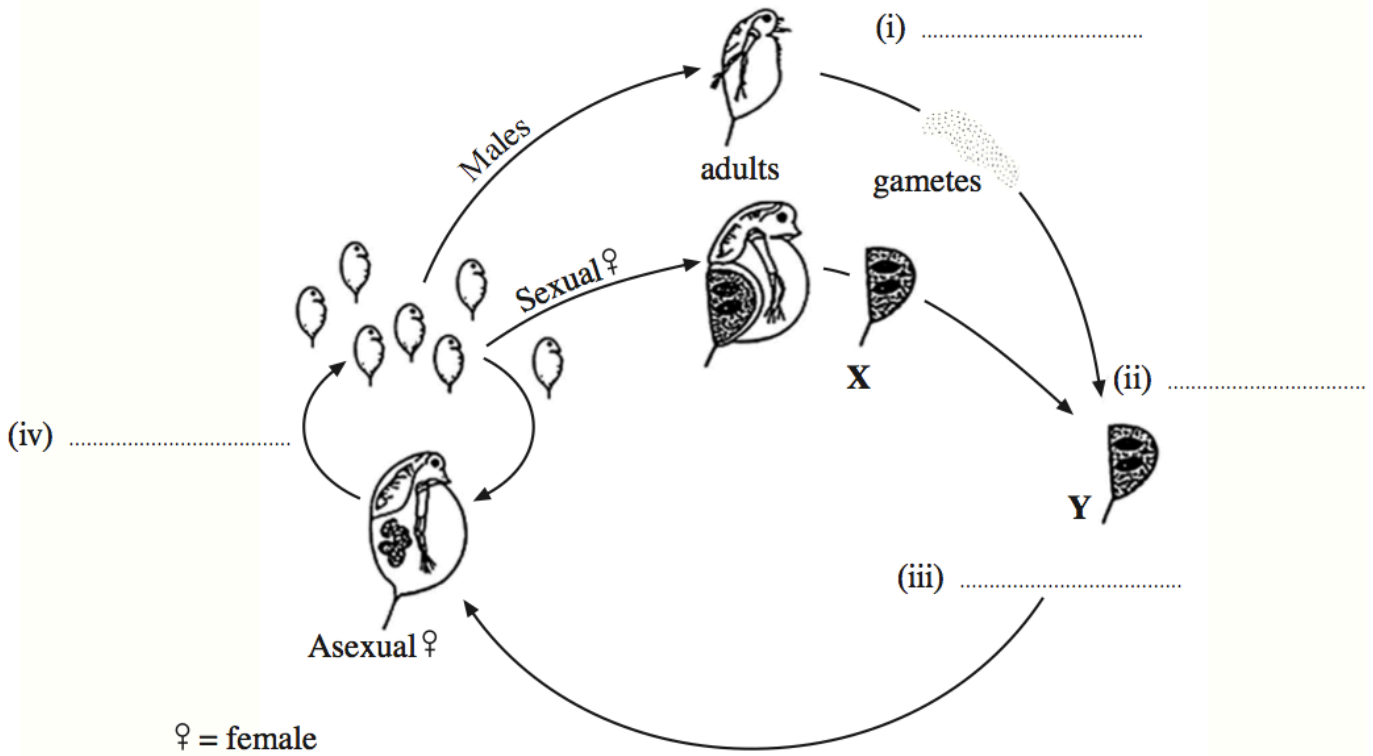
4.

5. Some organisms combine cycles of asexual reproduction with periods when they reproduce sexually. The sexual phase is induced when environmental conditions become unfavourable. The diagram shows the life cycle of the water flea, *Daphnia pulex*.

(a) Use the following words to complete the labelling of the diagram:

[2]

zygote, fertilisation, mitosis, meiosis.



- (b) State whether structures **X** and **Y** are haploid or diploid.

[1]

X , **Y**

- (c) (i) Give **one** potential advantage of reproducing asexually.

[1]

- (ii) Suggest why organisms such as *Daphnia* are stimulated by certain environmental conditions (eg. crowding, food shortage, temperature) to enter a sexual phase of reproduction. [2]

[2]

(d) (i) Explain what is meant by the term *internal* fertilisation. [1]

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(ii) Give **three** advantages of internal fertilisation and development to terrestrial animals. [3]

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(Total 10 marks)

5.

- (a) Many organisms can reproduce sexually and asexually. Give **two** advantages and **two** disadvantages of sexual reproduction. [4]

Advantages

1

2

Disadvantages

1

2

- (b) Suggest **two** reasons why most terrestrial animals rely on internal fertilisation. [2]

1

2

- (c) Suggest **three** reasons why the flowering plants have been so successful in the colonisation of the land. [3]

1

2

3

(Total 9 marks)

Essays

1.
 - (a) Describe the structural and reproductive characteristics of Angiosperms (flowering plants) that have led to their successful colonisation of land. [10]
2.
 - (b) Describe the advantages and disadvantages of asexual reproduction. [10]
3.
 - (a) Describe how the reproductive strategies of vertebrates show a gradual adaptation to the colonisation of land.
4.
 - (a) Distinguish between the two types of reproduction used by organisms and state the advantages and disadvantages of each. [7]

Explain how the reproductive strategies of flowering land plants have led to their success. [3]
5.
 - (b) Using fish and mammals as examples, explain how the reproductive strategies of animals have changed as a result of the evolution of life on land. Comment on the advantages of the mammalian strategies. [10]